FORM PTO-1390 (REV 5-93) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

# TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: 16202.160

U.S. APPLICATION NO. (If known, see 37 CFR 1.5): 09/254625

| INTERNATIONAL APPLICATION NO. | INTERNATIONAL FILING DATE | PRIORITY DATE CLAIMED |
|---|---|---|
| PCT/EP97/04662 | 27 AUGUST 1997 | 12 SEPTEMBER 1996 and 27 SEPTEMBER 1996 |

TITLE OF INVENTION: PROCESS FOR THE PRODUCTION OF BIOLOGICALLY...

APPLICANT(S) FOR DO/EO/US: Hans-Peter Esser

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. [ ] This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. [ ] A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [X] is transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] has been transmitted by the International Bureau.
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US)
6. [ ] A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. [X] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [X] are transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] have been transmitted by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [ ] have not been made and will not be made.
8. [ ] A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. [ ] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. [ ] A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

**Items 11. to 16. below concern other document(s) or information included:**

11. [ ] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [ ] A FIRST preliminary amendment.
    [ ] A SECOND or SUBSEQUENT preliminary amendment.
14. [ ] A substitute specification.
15. [ ] A change of power of attorney and/or address letter.
16. [X] Other items or information:

    International Search Report

| U.S. APPLICATION NO. (If known, see 37 CFR 1.5) | INTERNATIONAL APPLICATION NO. | ATTORNEY'S DOCKET NUMBER |
|---|---|---|
| | PCT/EP97/04662 | 16202.160 |

| 17. [X] The following fees are submitted: | CALCULATIONS | PTO USE ONLY |
|---|---|---|
| **Basic National Fee (37 CFR 1.492(a)(1)-(5)):** Search Report has been prepared by the EPO or JPO..... $850.00<br>International preliminary examination fee paid to USPTO (37 CFR 1.482) ..... $660.00<br>No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2))..$730.00<br>Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37CFR 1.445(a)(2)) paid to USPTO..... $980.00<br>International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4)..... $92.00 | | |
| **ENTER APPROPRIATE BASIC FEE AMOUNT =** | $420.00 | |
| Surcharge of $130.00 for furnishing the oath or declaration later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(e)). | $ | |

| Claims | Number Filed | Number Extra | Rate | | |
|---|---|---|---|---|---|
| Total Claims | -20 = | | X $22.00 | $ | |
| Independent Claims | - 3 = | | X $76.00 | $ | |
| Multiple dependent claims(s) (if applicable) | | | + $240.00 | $ | |
| **TOTAL OF ABOVE CALCULATIONS =** | | | | $ | |
| Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28). | | | | $ | |
| **SUBTOTAL =** | | | | $ | |
| Processing fee of $130.00 for furnishing the English translation later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(f)). + | | | | $ | |
| **TOTAL NATIONAL FEE =** | | | | $ 420.00 | |
| Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property + | | | | $ | |
| **TOTAL FEES ENCLOSED =** | | | | $ 420.00 | |
| | | | | **Amount to be: refunded** | $ |
| | | | | **charged** | $ |

a. [X] A check in the amount of $ 420.00 to cover the above fees is enclosed.

b. [ ] Please charge my Deposit Account No. _____ in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 50-0548. A duplicate copy of this sheet is enclosed.

**NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.**

SEND ALL CORRESPONDENCE TO:

Joseph W. Berenato, III
Liniak, Berenato, Longacre & White, LLC
6550 Rock Spring Drive, Suite 240
Bethesda, Maryland 20817

SIGNATURE

Joseph W. Berenato, III

NAME

30,546

REGISTRATION NUMBER

Form PTO-1390 (REV 5-93)

# VERIFIED STATEMENT CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) & 1.27(c))--SMALL BUSINESS CONCERN

Docket Number (Optional): 16202.160

Applicant or Patentee: Hans-Peter Esser
Serial or Patent No.:
Filed or Issued:
Title: PROCESS FOR THE PRODUCTION OF BIOLOGICALLY DEGRADABLE ALIPHATIC POLYESTER AMIDE SOLUTIONS

I hereby declare that I am

- [ ] the owner of the small business concern identified below:
- [XX] an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF SMALL BUSINESS CONCERN Peter Tils
ADDRESS OF SMALL BUSINESS CONCERN Am Hagedorn 14
D-52355 Duren, Germany

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.12, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees to the United States Patent and Trademark Office, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention described in:

- [XX] the specification filed herewith with title as listed above.
- [ ] the application identified above.
- [ ] the patent identified above.

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights in the invention must file separate verified statements averring to their status as small entities, and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization having any rights in the invention is listed below:

- [XX] no such person, concern, or organization exists.
- [ ] each such person, concern or organization is listed below.

Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING
TITLE OF PERSON IF OTHER THAN OWNER
ADDRESS OF PERSON SIGNING
SIGNATURE DATE

PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | |
|---|---|
| In re Application of | ) |
| | ) |
| Hans-Peter Esser | ) Art Unit: Not Assigned |
| | ) |
| Serial No. 09/254,625 | ) Examiner: Not Assigned |
| | ) |
| International Appl. No. PCT/EP97/04662 | ) |
| | ) |
| Filing Date: March 11, 1999 | ) |
| | ) Atty. Dkt. No. 16202.160 |
| For: PROCESS FOR THE PRODUCTION OF BIOLOGICALLY DEGRADABLE ALIPHATIC POLYESTER AMIDE SOLUTIONS | ) |

Box PCT
Commissioner of Patents
and Trademarks
Washington, D.C. 20231

**PRELIMINARY AMENDMENT**

Dear Sir:

Prior to the initial examination of the above-identified patent application, please amend the application as follows:

**IN THE CLAIMS**:

Claim 3, line 1, delete "or 2".

Claim 4, line 1, delete "one of Claims 1 through 3" and insert --Claim 1--.

Claim 5, line 1, delete "one of Claims 1 through 4" and insert --Claim 1--.

Claim 6, line 1, delete "one of Claims 1 through 5" and insert --Claim 1--.

Claim 7, line 1, delete "one of Claims 1 through 6" and insert --Claim 1--.

Claim 9, line 1, delete "one of Claims 7 or 8" and insert --Claim 7--.

Claim 10, line 1, delete "one of Claims 7 through 9" and insert --Claim 7--.

Claim 11, line 1, delete "one of Claims 7 through 10" and insert --Claim 7--.

Claim 12, line 1, delete "one of Claims 7 through 11" and insert --Claim 7--.

Claim 13, line 1, delete "one of Claims 1 through 12" and insert --Claim 1--.

Claim 16, line 1, delete "one of Claims 1 through 12" and insert --Claim 1--.

Claim 17, line 1, delete "one of Claims 1 through 12" and insert --Claim 1--.

**REMARKS**

The preceding Amendment has been made in order to amend multiple dependencies in the claims. Applicant asserts that all claims are in condition for examination. It is believed that no fee is due for this submission. Should that determination be incorrect, please debit Account No. 50-0548 and notify the undersigned.

Respectfully submitted,

Date: May 12, 1999

Joseph W. Berenato, III
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# PROCESS FOR THE PRODUCTION OF BIOLOGICALLY DEGRADABLE ALIPHATIC POLYESTER AMIDE SOLUTIONS

The present invention concerns a method for the manufacture of solutions of biodegradable plastics, in particular of aliphatic polyester amides, and the use of the resulting solution for the manufacture of films and the coating of substrates made of metal, paper, wood, plastic, ceramic, and foodstuffs.

Plastics are widely used in households, commerce, and industry, for example as shaped elements, films, and coatings. Disposal thereof after use, however, represents an increasing problem. In recent years, biodegradable plastics have therefore also been developed.

Polyester amides based on natural amino acids are known from Polym. Bull. 28 (1992) 301-307. They are manufactured by way of a complex protective-group technique, since natural amino acids in combination with hydroxycarboxylic acids are generally involved; this is very cumbersome. In addition, these polymers have absolutely no mechanical properties which are necessary for the manufacture of useful objects.

Further biodegradable polyester amides made of lactic acid, diamines, and dicarboxylic acid dichlorides are disclosed in US Patents 4,343,931 and 4,529,792. Japanese Patents 79 113 593 and 79 109 594 disclose biodegradable polymers made from caprolactone and caprolactam. The polyester amides just mentioned are, however, complex to manufacture.

A further polyester amide is disclosed in European Patent Application EP 641 817. The polyester amide described therein can be processed thermoplastically, and is biodegradable. It has a melting point of at least 75¡C, and the weight proportion of the ester structures is between 30 and 70%, and the proportion of amide structures between 70 and 30%. The aforesaid polymer has good mechanical properties, but processability is very difficult. Shaped elements can be manufactured from the polymer only in the mass. Solutions, for example in ethanol, are not stable, and quickly result in decomposition of the polymer.

It is the object of the present invention to manufacture solutions of biodegradable polyester amides so as to impart simplified and improved processability to them.

The subject matter of the present invention is a method for manufacturing solutions of biodegradable plastics, in particular of aliphatic polyester amides, which is characterized in that the aliphatic polyester amide is added to a solvent mixture containing

A) a C1-C4 alcohol;

B) a C1-C6 ketone; and/or

C) an aromatic carboxylic acid or a salt thereof.

It has been found, surprisingly, that biodegradable aliphatic polyester amides can be readily dissolved in the solvent mixture according to the present invention which contains components A, B and/or C. After only a few minutes, the polymer swells in the solution and dissolves. The dissolution rate can optionally be increased by mechanical actions such as agitation.

The resulting solution is stable for several days with no observable decomposition of the polymer structure.

According to a preferred embodiment, the method comprises the following steps:

a) the plastic is placed in a vessel;

b) the solvent mixture is added to the vessel until the plastic is covered by the solvent mixture;

c) the vessel is sealed and the plastic and solvent mixture are allowed to stand until the plastic has softened and swollen;

d) the softened and swollen plastic is mechanically comminuted and the resulting emulsion is preferably filtered.

During the swelling operation, it may be advantageous to add further solvent in order to accelerate the swelling operation or effect further swelling of the plastic, if the

solvent mixture originally added to the vessel has been completely absorbed by the plastic.

In order to increase the absorption surface area of the plastic in this context, it may be opportune to comminute the plastic mechanically during the swelling operation so as thereby to accelerate the process.

In order to obtain a clear solution, the softened and swollen plastic is preferably filtered; the filtered-out solids can be added to a new batch of plastic + solvent mixture.

According to an alternative embodiment, powdered plastic is introduced into the solvent with continuous agitation, so that it dissolves immediately and a coating can be made.

Methanol and/or ethanol are preferably used as the C1-C4 alcohols of component A; it is preferred for environmental reasons to use methanol and ethanol obtained from plant-based raw materials. The solvent mixture contains the C1-C4 alcohol preferably in a quantity of 70 to 98.9 wt%, in particular in a quantity of 90 to 98.9 wt%.

Acetone and butanone (methyl ethyl ketone) have proven particularly suitable as the C1-C6 ketone. The ketone is present in the solvent preferably in a quantity from 0.1 to 5 wt%, preferably from 0.1 to 2 wt%.

Benzoic acid and its derivatives, i.e. compounds in which the aromatic ring is the substituent, have proven particularly successful as aromatic carboxylic acids. Benzoates are preferably used, denatonium benzoate being particularly preferred. Component C is usually present in the solvent mixture in a quantity of 0.01 to 5 ppm.

One polyester amide that is preferably used is made up of aliphatic monomers in which the weight proportion of the ester structure is between 30 and 70% and the proportion of the amide structure is between 70 and 30%. To allow the polymer to be used outdoors, i.e. even in sunlight, the polyester amide should have a melting point of at least 75¡C.

Polyester amides that have proven suitable are, in particular, those described in

European Patent Application EP 0 641 817.

The average molecular weight (HW as determined by gel chromatography in n-cresol against a polystyrene standard) is from 10,000 to 300,000, preferably 20,000 to 150,000.

The polyester amides preferably used can be obtained in a manner known per se, for example by mixing the amide-forming and ester-forming starting components and then polymerizing them. Synthesis can also be accomplished by the "polyamide" method by stoichiometrically mixing the starting components, optionally with the addition of water and subsequent removal of water from the reaction mixture; and by the "polyester" method, by adding an excess of diol with branching of the acid groups, following by rebranching or reamidization of those esters. In the second variant method, excess glycol is also distilled off in the water.

The ester and amide segments are arranged purely statistically, governed fundamentally by the synthesis conditions. It is also possible, however, to use polyester amides in which the monomers are distributed as longer segments in the polymer molecule.

The following are used, for example, as monomers for the manufacture of the polyester amides which are preferably used:

Dialcohols such as ethylene glycol, 1,4-butanediol, 1,3-butanediol, 1,6-hexanediol, diethylene glycol, etc.; and/or dicarboxylic acids such as oxalic acid, succinic acid, adipic acid and their lower alkyl esters; and/or hydroxycarboxylic acids and lactones, such as caprolactone, etc.; and/or amino alcohols such as ethanolamine, propanolamine, etc.; and/or cyclic lactams such as a-caprolactam and laurolactam; and/or v-amino carboxylic acids such as aminocaproic acid, etc.; and/or mixtures (1:1 salts) of dicarboxylic acids such as adipic acid, succinic acid, etc. and diamines such as hexamethylenediamine, diaminobutane, etc.

Hydroxyl- or acid-terminated polyesters having molecular weights between 200

and 10,000 can also be used as the ester-forming component.

The resulting polyester amides can also contain 0.1 to 5 wt%, preferably 0.1 to 2 wt%, of so-called branching agents. Compounds of this kind can be, for example, trifunctional alcohols such as trimethylolpropane or glycerol, tetrafunctional alcohols such as pentaerythrite, trifunctional carboxylic acids such as citric acid. Incorporation of such components increases the melt viscosity of the polyester amides. The biodegradability of these materials is not, however, impeded.

The solvent mixture used according to the present invention can additionally contain, as well as the aforementioned components A, B, and C, further constituents which improve the solubility of the polymers and may stabilize the solution. The mixture can also contain water in a quantity up to 30 wt%, preferably between 0.1 and 10 wt%.

The films manufactured according to the present invention offer a much wider application spectrum for biodegradable polyester amides than the pure substances.

For example, it is possible to cast films from the solutions. Clear, elastic films are obtained, which can be manufactured in any desired thickness and can be used, for example, as compostable trash bags or milk films.

The films can contain any desired fillers; care should be taken that the compostability of the polymers is not impaired by such additives. Examples of fillers are talc, CaSO4 (for example, gypsum which is produced by flue gas desulfuration), compost, peat, garden mold, etc. The last-named fillers in particular make it possible to use the biodegradable polymers in agriculture and horticulture.

A further possible application of the solution obtained according to the present invention is utilization for coating substrates made of metal, paper, wood, plastic, ceramic, and foodstuffs. One possibility is use as a protective coating for metal substrates and glass as a protective coating during transport. In addition, for example, paper or board can be coated, so that the mechanical properties of board and paper and their resistance to moisture and water are enhanced, but the paper can be environmentally recycled after use. Coating can be accomplished, for example, with a dip method, by brush application, or

with a spray method. The films formed in each case can be pulled off in their entirety very quickly and without leaving a residue.

A further application of the solutions obtained according to the present invention is as an adhesive. For this, the solutions in concentrated form are applied onto the surfaces or points to be joined, and the surfaces are pressed together after a short exposure time which allows the solvent mixture to evaporate.

Example 1:

10 g of the polymer was placed in a beaker. 300 ml of a solvent mixture comprising 94 wt% ethyl alcohol, 2 wt% methyl ethyl ketone, 0.1 wt% denatonium benzoate, and water to make 100%, was added thereto and allowed to stand for three days. Swelling of the polymer was observed after a few hours. After two days the polymer was completely dissolved, yielding a clear, low-viscosity solution.

The polymer used was BAK 1095 (commercial product of Bayer AG, Leverkusen). BAK 2195 can also be used.

Example 2:

300 g of the polymer was placed in a beaker. The solvent mixture was added and was allowed to stand for 24 hours without heat, in a sealed vessel in which a vacuum had been drawn, until an increase in volume and a color change in the plastic had been noted.

The plastic was again covered with solvent, and then allowed to stand for approximately 24 hours in the sealed beaker.

This operation was repeated until an approximately threefold increase in volume had been noted, and the plastic was almost clear. The surface of the plastic was then sufficiently soft that mechanical comminution with a simple stirrer was possible. This operation was also repeated several times, further solvent being added as necessary for

dilution, until a low-viscosity solution was obtained. This was pressed through a fine-mesh filter to remove the solids still present in the emulsion.

The plastic used was BAK 1095. BAK 2195 can also be used.

Claims

1. A method for the manufacture of solutions of biodegradable plastics, in particular of aliphatic polyester amides, wherein the aliphatic polyester amide is added to a solvent mixture containing

A) a C1-C4 alcohol;

B) a C1-C6 ketone; and/or

C) an aromatic carboxylic acid or a salt thereof.

2. The method as defined in Claim 1, wherein methanol and/or ethanol are used as the C1-C4 alcohol.

3. The method as defined in one of Claims 1 or 2, wherein acetone and/or methyl ethyl ketone are used as the ketone.

4. The method as defined in one of Claims 1 through 3, wherein the aromatic carboxylic acid is benzoic acid.

5. The method as defined in one of Claims 1 through 4, wherein the polyester amide is a copolymer based on aliphatic monomers and has a melting point of at least 75¡C, and the weight proportion of the ester structure is between 30 and 70%, and the proportion of the amide structure is between 70 and 30%.

6. The method as defined in one of Claims 1 through 5, wherein the solvent mixture contains water in a quantity up to 30 wt%.

7. The method as defined in one of Claims 1 through 6, characterized by the

following steps:

a) the plastic is placed in a vessel;

b) the solvent mixture is added to the vessel until the plastic is covered by the solvent mixture;

c) the vessel is sealed and the plastic and solvent mixture are allowed to stand until the plastic has swollen and softened;

d) the softened and swollen plastic is mechanically comminuted and the resulting emulsion is preferably filtered.

8. The method as defined in Claim 7, wherein the swelling operation takes place under vacuum.

9. The method as defined in Claim 7 or 8, wherein solvent is added again at least once while the plastic is swelling.

10. The method as defined in one of Claims 7 through 9, wherein the swelling time is 2 to 60 hours.

11. The method as defined in one of Claims 7 through 10, wherein further solvent is added during comminution of the swollen plastic.

12. The method as defined in one of Claims 7 through 11, wherein the solids filtered out during filtration are added to a new batch of plastic + solvent mixture.

13. Use of the solvent obtained as defined by one of Claims 1 through 12 for the manufacture of films.

14. The use as defined in Claim 13, wherein the films contain fillers.

15. The use as defined in Claim 14, wherein compost, peat, garden mold, and/or CaSO4 are used as fillers.

16. Use of the solution obtained as defined in one of Claims 1 through 12 for coating substrates made of metal, glass, paper, wood, plastic, ceramic, and foodstuffs.

17. Use of the solution obtained as defined in one of Claims 1 through 12 as an adhesive.

[Modified sheets, IPEA/EP]

Claims

1. A method for the manufacture of solutions of biodegradable aliphatic polyester amides, wherein the aliphatic polyester amide is added to a solvent mixture containing

A) a C1-C4 alcohol;

B) a C1-C6 ketone; and/or

C) an aromatic carboxylic acid or a salt thereof.

2. The method as defined in Claim 1, wherein methanol and/or ethanol are used as the C1-C4 alcohol.

3. The method as defined in one of Claims 1 or 2, wherein acetone and/or methyl ethyl ketone are used as the ketone.

4. The method as defined in one of Claims 1 through 3, wherein the aromatic carboxylic acid is benzoic acid.

5. The method as defined in one of Claims 1 through 4, wherein the polyester amide is a copolymer based on aliphatic monomers and has a melting point of at least 75¡C, and the weight proportion of the ester structure is between 30 and 70%, and the proportion of the amide structure is between 70 and 30%.

6. The method as defined in one of Claims 1 through 5, wherein the solvent mixture contains water in a quantity up to 30 wt%.

7. The method as defined in one of Claims 1 through 6, characterized by the following steps:

a) the polyester amide is placed in a vessel;

b) the solvent mixture is added to the vessel until the polyester amide is covered by the solvent mixture;

c) the vessel is sealed and the polyester amide and solvent mixture are allowed to stand until the polyester amide has swollen and softened;

d) the softened and swollen polyester amide is mechanically comminuted and the resulting emulsion is preferably filtered.

8. The method as defined in Claim 7, wherein the swelling operation takes place under vacuum.

9. The method as defined in Claim 7 or 8, wherein solvent is added again at least once while the polyester amide is swelling.

10. The method as defined in one of Claims 7 through 9, wherein the swelling time is 2 to 60 hours.

11. The method as defined in one of Claims 7 through 10, wherein further solvent is added during comminution of the swollen polyester amide.

12. The method as defined in one of Claims 7 through 11, wherein the solids filtered out during filtration are added to a new batch of polyester amide + solvent mixture.

13. Use of the solvent obtained as defined by one of Claims 1 through 12 for

the manufacture of films.

14. The use as defined in Claim 13, wherein the films contain fillers.

15. The use as defined in Claim 14, wherein compost, peat, garden mold, and/or CaSO4 are used as fillers.

16. Use of the solution obtained as defined in one of Claims 1 through 12 for coating substrates made of metal, glass, paper, wood, plastic, ceramic, and foodstuffs.

17. Use of the solution obtained as defined in one of Claims 1 through 12 as an adhesive.

Please type a plus sign (+) inside this box → ☐

PTO/SB/01 (3-97)
Approved for use through 9/30/98. OMB 0651-0032
Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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# DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION

☒ Declaration Submitted with Initial Filing OR ☐ Declaration Submitted after Initial Filing

| | |
|---|---|
| Attorney Docket Number | 16202.160 |
| First Named Inventor | Hans-Peter Esser |
| *COMPLETE IF KNOWN* | |
| Application Number | |
| Filing Date | |
| Group Art Unit | |
| Examiner Name | |

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

PROCESS FOR THE PRODUCTION OF BIOLOGICALLY DEGRADABLE ALIPHATIC POLYESTER AMIDE SOLUTIONS

*(Title of the Invention)*

the specification of which

☐ is attached hereto

OR

☒ was filed on (MM/DD/YYYY) 08/27/97 as ~~United States Application Number or~~ PCT International Application Number PCT/EP97/04662 and was amended on (MM/DD/YYYY) _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code §119 (a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or §365 (a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

| Prior Foreign Application Number(s) | Country | Foreign Filing Date (MM/DD/YYYY) | Priority Not Claimed | Certified Copy Attached? YES | Certified Copy Attached? NO |
|---|---|---|---|---|---|
| 196 36 984.3 | Germany | 09/12/96 | ☐ | ☐ | ☒ |
| 196 40 032.5 | Germany | 09/27/96 | ☐ | ☐ | ☒ |
| | | | ☐ | ☐ | ☐ |
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☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below.

| Application Number(s) | Filing Date (MM/DD/YYYY) |
|---|---|
| | |

☐ Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

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PTO/SB/01 (3-97)
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# DECLARATION — Utility or Design Patent Application

I hereby claim the benefit under Title 35, United States Code §120 of any United States application(s), or §365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

| U.S. Parent Application Number | PCT Parent Number | Parent Filing Date (MM/DD/YYYY) | Parent Patent Number (if applicable) |
|---|---|---|---|
| | | | |

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As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: ☐ Customer Number OR ☒ Registered practitioner(s) name/registration number listed below → Place Customer Number Bar Code Label here

| Name | Registration Number | Name | Registration Number |
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| Joseph W. Berenato,III | 30,546 | Matthew Stavish | 36,286 |
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

**Name of Sole or First Inventor:** ☐ A petition has been filed for this unsigned inventor

| Given Name (first and middle [if any]) | Family Name or Surname |
|---|---|
| Hans-Peter | Esser |

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